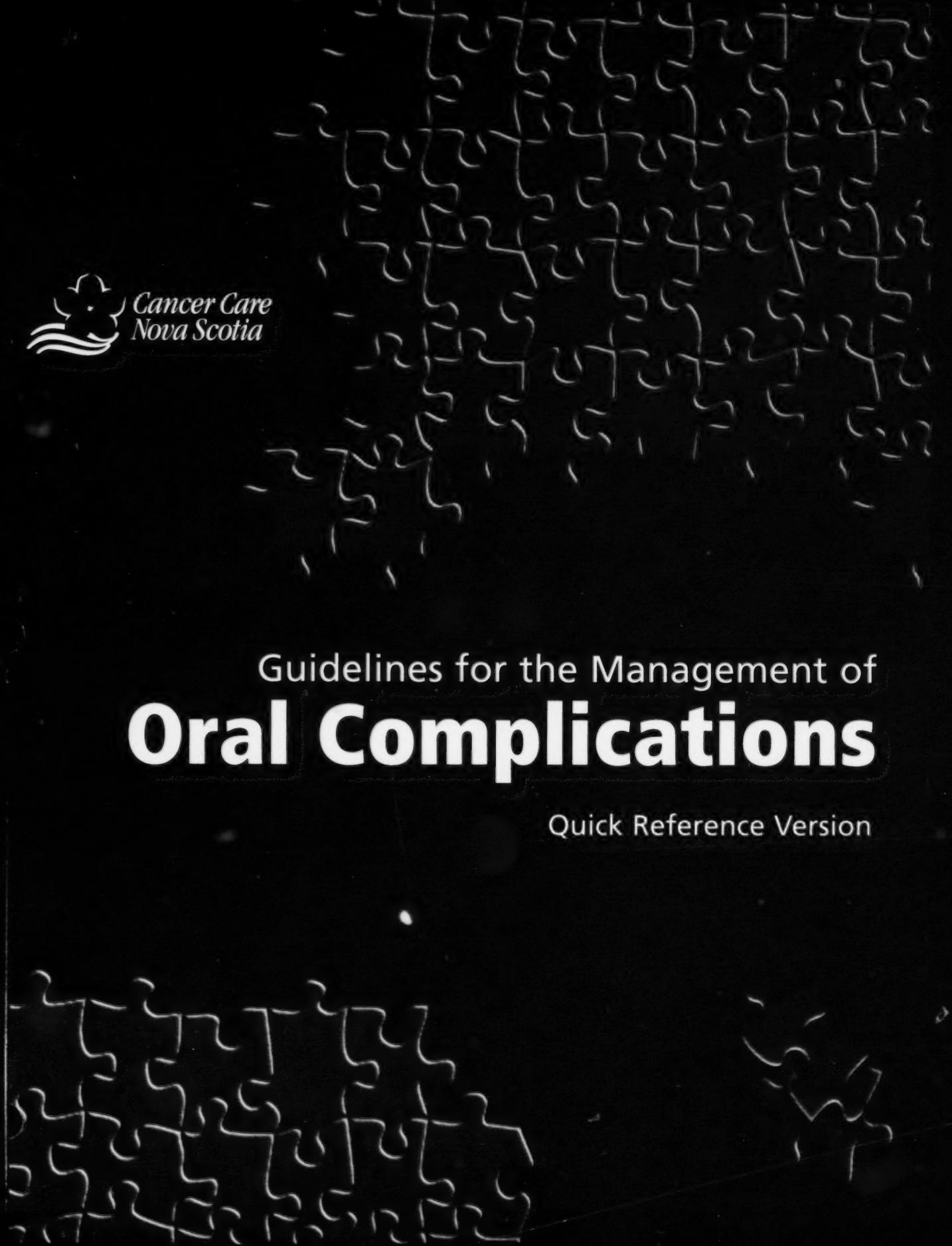

Guidelines for the Management of

Oral Complications

Quick Reference Version

Cancer Care Nova Scotia

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Best Practice Guidelines for the Management of

Oral Complications from Cancer Therapy

Quick Reference Version

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Best Practice Guidelines for the Management of Oral Complications from Cancer Therapy

Oral complications often result from systemic chemotherapy or radiotherapy to the head and neck. Complications may occur within days of high-dose chemotherapy, or weeks later with lower dose chemotherapy. Risk levels are defined in Figures 1 to 3.

Oral complications may be prevented by adherence to a mouth care protocol. Strict oral hygiene procedures and routine use of a mouth rinse solution (Tables 1 & 2) forms the basis of good oral care, to prevent development and escalation of oral infection. For higher risk patients, a pre-treatment dental exam (to rule out pre-existing oral disease) is included in routine prophylaxis.

All patients should be screened at each visit for oral mucositis and other oral complications (using the Stomatitis staging System score). A brief physical exam (including use of a flashlight to examine the oral cavity) should be conducted with attention to any symptoms reported by the patient (e.g. sore mouth, dry mouth, strange sensations, difficulty eating). If oral mucositis and/or another oral complication becomes a focus of care, assessment should be documented on the Mouth Care Record (Table 3). High risk patients should be assessed using the Mouth Care Record from the start of treatment.

Table 1 Mouth Rinse Solutions for Oral Complications

Tap water or bottled water
Carbonated soda water (commercial)
Sodium bicarbonate
- Add 1/2 tsp to 8 oz. of water, prepare fresh solution at least once daily

Normal saline
- Add 1/2 tsp of table salt to 8 oz. of water

- Rinse, swish and spit approx. 1 tbsp (15mL) several times after each meal, at bedtime and PRN

Management of oral complications may vary, depending upon level of treatment-associated risk, and the nature and severity of the problem. Involvement of the patient's dentist early in the care of higher-risk patients (See Figure 1) may improve prevention and post-treatment management of any oral problems. If the patient has difficulty eating as a result of oral pain or mucositis, a referral to a dietitian could be helpful. Severe oral complications may require hospital admission, especially if associated with an acute infection in a neutropenic patient, or if the patient is unable to eat. Management of specific oral complications is outlined in Figure 6.

Mucositis management has changed in recent years, with solid evidence-based recommendations in favour or against certain treatments. A rational step-wise approach is recommended in this guideline, limiting treatment to appropriate agents for specific patient symptoms. Use of various combination mouthwash formulations has been mostly empiric in oncology practices. In this guideline,it is recommended to limit the number of formulations to pain relief products only (see Table 6) and to eliminate any formulations that include antibiotic agents (e.g. nystatin). This recommendation is based on rational medication use principles to use agents only for symptoms present, to avoid use of ineffective prophylactic agents (e.g. antibiotics), and to employ products according to indication.

Table 2 Mouth Rinse Solutions for Pediatric Cancer Patients

- Chlorhexidine 0.12% (e.g. Oro-X with Chlorhexidine 0.12% MIC)
- 5mL if <6 years, 10mL if > 6 years
- Swish and spit BID-QID, or swab mouth or rinse soother up to QID

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Table 3

Mouth Care Record for Cancer Patients

Dental Assessment: Date Completed _____

STOMATITIS STAGING SYSTEM

Add the scores of the lesions, colour and bleeding to identify the stomatitis stage 0 = **N**ormal; 1-4 = **M**ild; 5-7 = **I**ntermediate; 8-9 = **S**evere

SCORE	LESIONS	COLOUR	BLEEDING
0	None	More than 50% pink	None
1	1-4	More than 50% slightly red	None
2	More than 4	More than 50% moderately red	Bleeding with eating or mouth care
3	More than 50% denuded	More than 50% very red	Spontaneous

MOUTH ASSESSMENT	DATE:												
	TIME:												
Stomatitis see Stomatitis Staging System above	Lesions												
	Colour												
	Bleeding												
	Total Score												
	Stomatitis Stage (N, M, I or S)												
Pain (0-10 scale)	Mouth Pain												
	Throat Pain												
	Pain on Swallowing												
Function (**Y**es or **N**o)	Xerostomia												
	Taste Altered												
	Able to swallow												
Eating Check (✓)	Eating all foods												
	Liquids only												
	Not eating or drinking												
Suspected Infection (**Y** or **N**)													

MOUTH CARE PLAN

Care Plan Check (✓)	Basic												
	Intensified												
Stomatitis & Pain Check (✓)	Coating Agent												
	Lubricant												
	Pain Medication Needed (**Y** or **N**)												
	Topical Analgesic (ie. Benzydamine)												
	Anesthetic/Pain Relief Mouthwash												
	Systemic Analgesic												
HSCT/BMT Patients	Parenteral (IV) Opioid												
	Somnolence Score (1-4)												
Infection Management (**Y** or **N**) Check (✓)	Systemic Antifungal(s)												
	Topical Antifungal(s)												
	Other Antibiotic(s)												
Care Provider Check (✓)	Self												
	Assisted												
	Totally by Other												
Patient Teaching- Check (✓)													
	Notes- (✓)												
	Initials												

Figure 1 Dental Assessment & Interventions for Cancer Patients: Low and Intermediate Risk for Oral Complications

LOW RISK (10%)
Adjuvant/Palliative Chemotherapy Patients

Pretreatment Dental Exam

The dentist should receive key information about the cancer patient prior to the assessment, including:

- Cancer diagnosis, such as type, stage, prognosis
- Current CBC and other relevant bloodwork results; hematologic and immunologic status
- Treatment planned for the patient, including planned date for first treamtent
- If radiation is planned, field and dose of radiation

Assess as early as possible- one month before cancer treatment if invasive oral procedure(s) needed

Pretreatment Interventions

May be directed to (as necessary):

- Mucosal lesions
- Dental caries and endodontic disease
- Periodontal disease
- Poorly-fitting dentures, orthodontic appliances
- Temporomandibular dysfunction
- Salivary abnormalities
- Patient education on oral hygiene plan

By community dentist or on referral to oral surgeon or oral pathologist

Information to Send Back to Oncology Team:

- Amount & severity of dental caries
- Number of teeth requiring restoration or extraction
- Teeth requiring endodontic treatment, or other endodontic disease issues (or recommendation for chlorhexidine use)
- Periodontal disease status
- Any other urgent dental care required
- Time needed to stabilize any oral disease

INTERMEDIATE RISK (40%)
Primary Chemotherapy (e.g. Hematologic Maligancy) & some Gastrointestinal Cancer Chemotherapy Patients

Same as Low Risk, plus

- Pretreatment dental exam and interventions may be performed by oral oncology team/hospital dentist or referred to community dentist

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Figure 2 Dental Assessment & Interventions for Cancer Patients: High Risk for Oral Complications

HIGH RISK (80-100%)
Head & Neck Cancer Patients on Radiotherapy

Same as Low Risk, plus

- Comprehensive pretreatment dental exam and interventions may be performed by oral oncology team/hospital dentist or referred to community dentist, oral surgeon or oral pathologist
- Fabrication of custom flouride trays or PrevDent for radiation patients
- Pretreatment assessment by prosthodontist prior to any radiotherapy to the head and neck; preparation and fitting for prosthodontic appliances as required
- Eliminate oral disease before treatment (e.g. dental extraction of high-risk dentition) for radiotherapy patients

Post Radiotherapy:

- Annual follow-up visits with prosthodontist and regular visits to dentist (every 4 months) for cleaning and assessment (dental caries prevention)- for 2 years after radiotherapy.
- Then annual dentist visits (or more often as needed)
- Daily oral fluoride tablets (e.g. Prevident) may be used to avoid ongoing superficial fluoride applications.

HIGH RISK (80-100%)
Bone Marrow/Stem Cell Transplant Patients

Same as Low Risk, plus

- Comprehensive pretreatment dental exam and interventions may be performed by oral oncology team/hospital dentist or referred to community dentist, oral surgeon or oral pathologist
- Eliminate oral disease before treatment (e.g. dental extraction of high-risk dentition)

Post Transplant:

- Caution with any oral treatments or interventions (including dental scaling & polishing) for at least one year after transplant, even if hematology parameters return to normal and graft-versus-host disease has resolved; patient immune systems do not return to normal for at least one year post-transplant

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Table 4 Basic Mouth Care Plan	
Flossing	• Flossing with dental floss allows a patient to clean surfaces between the teeth • Flossing is usually done before brushing, and before going to bed. • The patient should continue their flossing practices, using the same type of dental floss as they have done in the past. • If flossing causes bleeding of the gums which does not stop after 2 minutes, it should be discontinued. Flossing may be restarted when the platelet count is $\geq 20 \times 10^9$/L, or as instructed by their cancer care team. • Patients who have not flossed routinely before cancer treatment should not begin flossing at this time • Patients with cancers in the mouth may not be able to floss
Brushing	• Use a small, soft-headed, rounded-end, bristle toothbrush (electric toothbrushes are not preferred), and a fluoridated toothpaste or gel (preferably with a neutral taste) • Brush teeth 4 times daily, within 30 minutes after eating and before bed. Brush after flossing • Rinse toothbrush in hot water to soften it before using • Brush tongue gently from back to front • Rinse brush after using in hot water. Air dry. • Change toothbrush when bristles are not standing up straight (about once per month) <u>Patients with Head & Neck Cancers</u> • Brushing may not be appropriate because of tumor involvement. Patient may attempt to clean teeth with a moist gauze wrapped around the finger or a foam swab soaked in rinsing solution, if able. Otherwise patient should rinse mouth several times with rinsing solution. <u>Dentures</u> • Remove dentures, plates and prostheses before beginning mouth care. • Rinse mouth thoroughly with rinse solution. • Brush and rinse dentures after meals and at bedtime. Rinse with rinsing solution before placing in mouth. Remove from mouth for long periods (at least 8 hours/24). Soak in rinsing solution.
Rinsing	• Rinsing the oral cavity helps to maintain the moisture in the mouth, removes the remaining debris and toothpaste, and reduces the accumulation of plaque and infection • Rinse vigorously several times after brushing and flossing, using one of the rinsing solutions
Lip Care	• Coat lips with an oil-based or water soluble lubricant to keep them moist. Water soluble lubricants may be used inside and outside the mouth, and can be used with oxygen, since there is no risk of aspiration. • Apply the lubricant after each cleaning,at bedtime, and as needed. Water-based lubricant needs to be applied more frequently.
Eating	Avoid abrasive, rough, spicy, acidic and hot foods. All irritants should be avoided, especially alcohol and tobacco. Eat soft foods. Avoid foods containing a lot of sugar, and really cold foods. Encourage high-density and high-fibre foods to clean teeth and massage gums. Encourage a well-balanced diet, high in protein, vitamins B & C. Encourage a fluid intake of at least 2 litres per day to keep mucous membranes moist.

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Figure 3 Prevention & Management of Oral Complications in Low Risk Patients

LOW RISK (10%)
Patients treated with Adjuvant/Palliative Chemotherapy

ASSESSMENT

Screen each patient with Stomatitis Staging System scale

Pretreatment Dental Exam recommended

PREVENTION

Prevention
Oral cryotherapy (ice chips) for 30 minutes, beginning 5 minutes prior to 5-Fluorouracil administration

Use Basic Mouth Care Plan: (See Table 4)
- Drink plenty of fluids (2L/day)

Follow oral care Recommendations of Dentist
- Dentist may order Chlorhexidine for dental caries prevention when there is no mucositis

Patient Education on mouth care and how to manage oral complications from cancer therapy

If **mucositis** is identified from routine screening
- If mucositis or other oral complications are a focus of care, assess with Mouth Care Record until symptoms resolved

MANAGEMENT

Stepped Approach for Management

1. Mucosal coating agent (antacid, kaolin suspensions)- to provide a temporary physical barrier
   - **Do NOT use Chlorhexidine** if there is mucositis
2. Water-soluble lubricating agents (artificial saliva, KY Jelly, OraBase)- to moisten the mucosa
3. Topical analgesic (benzydamine)- to reduce pain by anti-inflammatory effect
4. Topical anesthetics (lidocaine, benzocaine)- to reduce pain by numbing the mouth
   - May use Pain Relief Mouthwash if needed for oral pain (combination of mucosal coating agent and topical anesthetic) See Table 6
5. Systemic analgesics (oral, IV bolus, continuous IV infusion morphine or hydromorphone) for severe pain

May add oral Fluconazole for prevention or treatment of oral fungal infection

Oral Infection
- See Table 10

Oral Hemorrhage:
- Treat with ice water and local pressure

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Table 5 Agents for Mucositis Management (Stepped Approach)

1. Mucosal Coating Agents	Alumina suspension (e.g. Amphojel™)- constipating effects Magnesia Suspension (e.g. Milk of Magnesia™)- laxative effects Magnesia and Alumina Suspension (e.g. Maalox™)- balanced bowel effects Attapulgite suspension (Kaopectate™)- mild constipating effects • May use 5-10mL 4-6 times daily to coat the mucosal surfaces
2. Water-Soluble Lubricating Agents	Artificial Saliva (e.g. Moi-Stir™, Salivart™)- 1-2mL PRN OraBase™
3. Topical Analgesics	Benzydamine topical rinse (e.g. Tantum™)- No effect on gag reflex • Rinse mouth with 10-15 mL q 4-6 hours; swish around mouth and spit out • May have a drying effect (from alcohol in formulation) May consider systemic analgesics (e.g. Acetaminophen) or NSAID (e.g. ibuprofen, naproxen)- unless patient at risk of febrile neutropenia
4. Topical Anesthetics/ Pain Relief Mouthwash Formulations	Lidocaine: Viscous, Ointment, Sprays (e.g. Xylocaine™)- Xylocaine Viscous is a thick paste, most patients dislike the sensation of this viscous product • Swish and swallow slowly or spit out of mouth 5-10 mL q4h PRN; may inhibit gag reflex- do not eat or drink for at least 30 minutes after dose • Anesthetic effects occur in 5 minutes and last 20-30 minutes Diphenhydramine liquid (e.g. Benadryl™)- may cause sensitization of the mucosal tissue; used in patients who cannot tolerate other anesthetics • Swish and swallow 5-10 mL q4h PRN; Use non-alcoholic liquid formulation • Lidocaine and/or Diphenhydramine are components of the Pain Relief Mouthwash formulations
5. Systemic Analgesics	Opioid Drugs: Oral, IV Bolus Morphine or Hydromorphone Continuous infusion, PCA dosing of Morphine or Hydromorphone for severe pain- Use according to institutional policy

Table 6 Pain Relief Mouthwash Suspensions

Pain Relief Mouthwash with Attapulgite (Kaopectate™)	Mild constipating effect
• Diphenhydramine 6.25mg/5 mL (Benadryl™) liquid	50 mL
• Lidocaine (Xylocaine™) viscous 2%	25 mL
• Attapulgite (Kaopectate™) suspension	25 mL
TOTAL VOLUME	100 mL

Lidocaine may inhibit gag reflex. If this is a problem, order Pain Relief without Lidocaine.

Pain Relief Mouthwash with Antacid	Balanced effect on the bowels
• Diphenhydramine 6.25mg/5 mL (Benadryl™) liquid	50 mL
• Lidocaine (Xylocaine™) viscous 2%	25 mL
• Magnesia-Alumina Concentrate Suspension (Maalox TC™)	75 mL
TOTAL VOLUME	150 mL

Lidocaine may inhibit gag reflex. If this is a problem, order Pain Relief without Lidocaine.

Pain Relief Mouthwash without Lidocaine	Mild constipating effect
• Diphenhydramine 6.25mg/5 mL (Benadryl™) liquid	50 mL
• Attapulgite (Kaopectate™) suspension	50 mL
TOTAL VOLUME	100 mL

Used for patients who cannot tolerate lidocaine anesthetic. Diphenhydramine may cause sensitization of the oral tissues.

After brushing teeth and rinsing mouth, swish 10-15mL for up to 2 minutes, then spit out or swallow slowly. Repeat TID-QID PRN. Avoid putting anything in the mouth (including medications) for 30 minutes, especially if mouthwash swallowed. Systemic absorption of swallowed lidocaine may be contraindicated in patients with impaired cardiovascular function.

- Oral Fluconazole (or another absorbable systemic antifungal agent) is preferred for the prevention and/or treatment of oral candidiasis (Evidence-based statement).

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Figure 4 Prevention & Management of Oral Complications in Intermediate Risk Patients

INTERMEDIATE RISK (40%)
Primary chemotherapy (e.g. Hematologic Malignancies) and some Gastrointestinal Cancer Chemotherapy

SCREENING

Screen each patient with Stomatitis Staging System scale

Pretreatment Dental Exam required

PREVENTION

Prevention
Oral cryotherapy (ice chips) for 30 minutes, beginning 5 minutes prior to 5-Fluorouracil administration (unless Oxaliplatin will also be given)

Patient Education on mouth care and how to manage oral complications from cancer therapy

Basic Mouth Care Plan: (Table 4)
- Drink plenty of fluids (2L/day)

Follow oral care Recommendations of Dentist
- Dentist may order Chlorhexidine for dental caries prevention when there is no mucositis

ASSESSMENT

If **mucositis** or other oral complications are identified from routine screening, and become a focus of care, assess with the CTC scale and other sections on the Mouth Care Record until symptoms resolved

MANAGEMENT

- Increase to Intensified Mouth Care Plan if stomatitis worsens
  - Continue flossing unless bleeding (> 2 minutes)
  - Brush teeth gently with ultra soft toothbrush
  - Use mouth rinse solution q1-2hr (q4h during the night)
  - Referral to dietitian for any nutritional problems
  - Add antibiotics or other treatments as needed for additional symptoms

Stepped Approach for Management – below (see Low Risk)

1. Mucosal coating agent (i.e. attapulgite [Kaopectate™] antacid suspensions)
   - **Do NOT use Chlorhexidine** if there is mucositis
2. Water-soluble lubricating agents (e.g. artificial saliva, KY Jelly, OraBase)
3. Topical analgesic (i.e. benzydamine)
4. Topical anesthetic (i.e. lidocaine)
   - May use Pain Relief Mouthwash if needed for oral pain (Table 6)
5. Systemic opioid analgesics (oral, IV bolus morphine or hydromorphone) for severe pain

May add oral Fluconazole for prevention or treatment of oral fungal infection

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Table 7 Intensified Mouth Care Plan	
In Addition to Basic Mouth Care Plan	
Flossing	• Continue until discomfort becomes too great • Discontinue flossing if gums bleed for longer than 2 minutes. Advise patient to try to begin again when platelet count rises >20 x 10^9 cells/mL.
Brushing	• Use ultra soft toothbrush (Butler 435 stocked on some inpatient units) • Encourage patient to continue brushing through treatment even when it causes discomfort. If unable to tolerate brushing after benefits are reinforced and weighed against the detriments, try to clean teeth with a moist gauze wrapped around finger or a foam swab soaked in rinsing solution. • Consider the use of a topical analgesic q 4-6 hours to promote more thorough tooth brushing when continuous pain is present. Oral analgesics (opioids) should be given 60 minutes before brushing. • Consider a topical anesthetic before brushing to minimize pain. • If bleeding does occur, encourage more gentle brushing. If bleeding does not stop after 2 minutes, consider cleaning with gauze, toothette or vigorous rinsing (with rinsing solution). Restart brushing when platelet count > 20 x 10^9 • If the gingival tissue bleeds, clean teeth with a moist gauze wrapped around the finger or a foam swab • If there has been an oral infection, use a new toothbrush after infection is resolved. • Dentures Keep out of mouth as much as possible
Rinsing	• Perform in place of brushing if patient absolutely unable to brush. • As well as after meals, encourage rinsing every 1-2 hours while awake, and every 4 hours through the night if awake (to minimize complications of decreased saliva). • If unable to clean using toothette or gauze or swishing (or tilting head), syringe rinsing solution into different areas of mouth if platelet level is not too low.

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Figure 5 Prevention & Management of Oral Complications in Head & Neck Cancer (High Risk) Patients

SCREENING

Assess each patient with Mouth Care Record from beginning of treatment until all symptoms are resolved (no longer a focus of care)

Comprehensive dental exam before treatment

- Prosthodontic care prior to radiotherapy to oral cavity
- Eliminate oral disease before treatment (e.g. dental extraction of high-risk dentition) for radiotherapy patients

PREVENTION

Prevention- Patients on Radiotherapy

- Topical application of benzydamine solution
- Consider use of midline radiation blocks/ 3-D radiotherapy treatment
- Do NOT use acyclovir for mucositis prevention
- Do NOT use chlorhexidine, sucralfate, acyclovir, or antimicrobial lozenges to prevent mucositis

Use Intensified Mouth Care Plan: (Table 7)

- Drink plenty of fluids (2L/day)
- Oral Fluconazole for prevention of candidiasis

Follow oral care Recommendations of Dentist

- Dentist may order Chlorhexidine for dental caries prevention when there is no mucositis

Patient Education on mouth care and how to manage oral complications from cancer therapy

MANAGEMENT

Stepped Approach for Management

1. Mucosal coating agent (i.e. attapulgite [Kaopectate™] antacid suspensions)
   - **Do NOT use Chlorhexidine** if there is mucositis
2. Water-soluble lubricating agents (e.g. artificial saliva, KY Jelly, OraBase)
3. Topical analgesic (i.e. benzydamine)
4. Topical anesthetics (e.g. lidocaine)
   - May use Pain Relief Mouthwash if needed for oral pain (Table 6)
5. Systemic opioid analgesics (oral, IV bolus morphine or hydromorphone) for severe pain

Xerostomia Management for Head & Neck Radiotherapy Patients:

- Frequent sips of water
- Ice chips
- Oral pilocarpine (5mg BID to TID)
- Artificial saliva, as tolerated

Oral Hemorrhage:

- Treat with ice water and local pressure

Oral Infection

- Use appropriate antibiotic
  - For candida may use oral Fluconazole for prevention or treatment
  - If Nystatin suspension used for treatment, give this after topical analgesic or anesthetic for treatment of oral fungal infection- Swish and swallow
- See Table 8

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Figure 6 Prevention & Management of Oral Complications in Hematopoietic Stem Cell Transplant (High Risk) Patients

SCREENING

Assess each patient with Mouth Care Record from beginning of treatment until all symptoms are resolved (no longer a focus of care)

Comprehensive dental exam before treatment

- Prosthodontic care prior to radiotherapy to oral cavity (i.e. TBI patients)
- Eliminate oral disease before treatment (e.g. dental extraction of high-risk dentition)

PREVENTION

Prevention- Stem Cell Transplant Patients

- Oral cryotherapy (ice chips) for 30 minutes beginning 5 minutes prior to high dose Melphalan chemotherapy (if this is part of the HSCT conditioning regimen)
- Palifermin 60 mcg/Kg daily for 3 days prior to and 3 days following stem cell transplantation (when available in Canada)
- Do NOT use pentoxyfylline or acyclovir to prevent mucositis

Use Intensified Mouth Care Plan: (Table 7)

- Drink plenty of fluids (2L/day)
- Oral Fluconazole for prevention of candidiasis

Follow oral care Recommendations of Dentist

- Dentist may order Chlorhexidine for dental caries prevention when there is no mucositis

Patient Education on mouth care and how to manage oral complications from cancer therapy

MANAGEMENT

Stepped Approach for Management

1. Mucosal coating agent (i.e. attapulgite [Kaopectate™] antacid suspensions)
   - **Do NOT use Chlorhexidine** if there is mucositis
2. Water-soluble lubricating agents (e.g. artificial saliva, KY Jelly, OraBase)
3. Topical analgesic (benzydamine)
4. Topical anesthetics (i.e. lidocaine)
   - May use Pain Relief Mouthwash if needed for oral pain (Table 6)
5. Systemic opioid analgesics (oral, IV bolus, continuous IV infusion or PCA morphine or hydromorphone) for severe pain

Oral Hemorrhage:

- Treat with ice water and local pressure

Oral Infection

- Use appropriate antibiotic
  - For candida use oral Fluconazole (or another azole antifungal agent) for prevention or treatment
  - If oral azole antifungals are contraindicated, Nystatin suspension may be used for treatment, give this at least 30 minutes after topical analgesic or anesthetic for treatment of oral fungal infection- Swish and swallow
- See Table 8

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Table 8 Presentation and Treatment of Oral Infections in Cancer Patients		
Infection	**Appearance and Characteristics**	**Treatment**

Fungal infections including Candidiasis	Oral candidiasis may have one of several different clinical appearances
	• Pseudomembranous candidiasis, also known as thrush, is the most common form of oral candidiasis. It typically appears as white patches on the surface of the oral mucosa, and/or tongue, that develop into confluent plaques that resemble milk curds and can be wiped off to reveal a raw erythematous and sometimes bleeding base which may be tender.
	• Chronic hyperplastic candidiasis (or candidal leukoplakia) is a less common, asymptomatic form of candidiasis, that appears as a dense, white plaque that is hard and rough to the touch (plaquelike lesion). Homogeneous or speckled areas, which do not rub off (nodular lesions), can be seen, usually on the inside surface of one or both cheeks.
	• Angular cheilitis (perleche) is a type of candidiasis that appears as red, eroded, fissured lesions which occur bilaterally in the commissures of the lips and are frequently irritated and painful.
		Oral systemic antifungals are usually the drug of choice for prevention and/or treatment of candidiasis in cancer patients with normal immune function.
		• **Fluconazole 100 mg PO daily** is equal or more effective against oropharyngeal candidiasis in cancer patients than nystatin or clotrimazole. Prophylactic fluconazole 100 mg PO daily (400 mg PO daily for HSCT patients) may be considered for prevention of oral candidiasis in cancer patients. Maintenance therapy to prevent relapse after initial treatment- 50 mg (up to 400 mg) daily
		• **Nystatin** suspension 100,000U/mL- Use in patients who cannot tolerate Fluconazole (or other azole antifungals); Swish around and hold in the mouth for at least one minute, then swallow; use 5 mL qid for 7-14 days (works by direct contact)
		  • For children, use 2mL for infants, or 4 to 6 mL for children- Swish and swallow or swab mouth QID
		• Nystatin cream to treat dentures
		• Nystatin popcicles (for cooling relief)
		• **Clotrimazole** oral suspension 1mg/mL- Swish around the mouth for one minute and then swallow; use 10 mL qid
		  • For children, use 3mL if < 1 year, 5mL if 1-3 years, , or 10mL if > 3 years- Swish and swallow or swab mouth
		• Clotrimazole troche 10 mg 5x daily

Bacterial infection	Periodontitis or gingivitis (oral infections) usually appear as reddened gums which bleed easily on probing. When the natural flora is affected by cancer therapy, some of the bacteria may proliferate and invade the gastroinestinal, cardiovascular, renal, or respiratory systems, resulting in systemic infections (such as bacterial endocarditis or glomerulonephritis). Local infections in the oral cavity may provide foci for systemic infection.	Eliminate oral sources of bacteremia before chemotherapy (consult dentist) • Assessment and interventions for advanced periodontal disease, periapical pathosis **Broad-spectrum systemic antibiotic** therapy (e.g. Cloxacillin or cephalexin)

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Table 8 Presentation and Treatment of Oral Infections in Cancer Patients		
Infection	**Appearance and Characteristics**	**Treatment**
Herpes simplex	Symptomatic primary infection, with multiple, small, clustered vesicles in numerous locations, can occur anywhere in the oral cavity, on the perioral skin, on the lips, or on the pharynx, and can be severe. Extensive ulceration can make eating painful. Headache, fever, painful lymphadenopathy, and malaise are common. Recurrent herpes lesions (or cold sores) occur on keratinized mucosa (usually the lips, attached gingiva, and/or the hard palate). Vesicles often break quickly, so the lesions may appear as small clustered ulcers.	**Topical acyclovir**- Apply to affected area q3-4h, for a total of 6 times/d, for 7 d; apply a sufficient quantity to adequately cover all lesions **Systemic acyclovir** for larger lesions • Primary HSV: 200 mg q4h PO 5 times/day for 10 days or 500 mg tid PO for 7-10 days (In immunocompromised patients, consider 400 mg q4h PO 5 times/day for 10 days) • Recurrent HSV: 200 mg q4h PO 5 times/d for 5 d **Valacyclovir** 500 mg BIDPO for 7 d (Primary HSV)
Varicella-zoster	Recurrent varicella (also known as herpes zoster or shingles) results in a vesicular rash that usually affects a single dermatome. Inside the oral cavity, this may be observed as vesicles or ulcerations that stop sharply at the midline. A prodrome of pain, burning, or itching that mimics a toothache may occur. After the resolution of the rash, postherpetic neuralgia may linger for a month or longer, especially in patients who are immunosuppressed.	**Acyclovir** 400 mg 5 times/day PO for 7-10 days; for severe infection, 5 mg (base) per kg body weight q8h IV for 5-7 days (administer over at least 1 h); patients with acute or chronic renal impairment may require dose reduction (200 mg q12h PO when CrCl 0-10 mL/min0 **Valacyclovir** 1000 mg TID PO for 7 days
Cytomegalo-virus	CMV infection may cause esophagitis, which is occasionally accompanied by oral ulcerations or erythema. Oral ulcerations are clinically nonspecific; a biopsy is required for definitive diagnosis.	**Ganciclovir** (individualized dosing)
Non-herpes virus infections	Verruca vulgaris (common warts) in the oral cavity are usually sharp-tipped, verrucous, white and elevated with discrete borders. The lesions most commonly occur on the lips, hard palate, or gingiva. Verruca plana is similar but less elevated. Warts are commonly observed on the digits of patients with oral infection. Condyloma acuminata, or genital warts may also affect the oral mucosa. These lesions are usually cerebriform, pink, and sessile; they occur more commonly on nonkeratinized mucosa than on keratinized mucosa.	**Laser surgery** or **cryotherapy** to remove oral HPV lesions **Intralesional injections of Imiquimod** (Aldara™) may be used for recurrent lesions May be surgically excised

May be duplicated for use in clinical practice. As appears in: Broadfield L, Hamilton J., Best Practice Guidelines for the Management of Oral Complications from Cancer Therapy-Quick Reference Version. © *Cancer Care Nova Scotia*, 2006

Table 9- Guideline Recommendations/Suggestions and Best Practice Statements

For this guideline, the evidence-based recommendations are included to support the guideline contents . Due to the poor quality or absence of published research, the meta-analyses illustrate that there are very few aspects of the prevention or management of oral mucositis where the evidence is sufficient to make an EBR. There is, however, convincing evidence on the optimal prevention of oral candidiasis in cancer patients. The 2004 guideline publication by the Multinational Association of Supportive Care in Cancer (MASCC), which was updated at the 2005 MASCC meeting (proceedings unpublished to date) is the only paper that provides evidence-based recommendations (EBRs) across a similar scope as this guideline.

The MASCC recommendations (and one PEBC guideline) are adapted for local use in this guideline, based upon the most current update. If there is strong supporting evidence for a practice, this will be indicated as a "**Guideline Recommendation**"; if the supportive evidence is weak, this will be indicated as a "**Guideline Suggestion**". All guideline statements will be followed by the Level of Evidence and Grade of the Recommendation (as assigned by the MASCC Expert Panel). A practice for which there is little or inconclusive evidence but which is commonly supported in the literature will be indicated as a "**Best Practice Statement**", in order to provide direction in the absence of supporting evidence.

1. Screening for Oral Complications

Best Practice Statement:

Ambulatory patients and hospital inpatients on active chemotherapy should be screened on a regular basis with the Stomatitis Staging System scale for evidence of oral complications. Inspection of the oral cavity using a flashlight should be included in the systematic assessment of patients before each cyle of active chemotherapy. If stomatitis is identified, the Mouth Care Record (MCR) should be used for ongoing assessment until the stomatitis is resolved.

Patients at high risk of serious oral complications (e.g. HSCT patients, or patients receiving radiotherapy to the oral cavity area) should not be screened, but should begin care with routine assessment using the MCR in anticipation of oral complications.

2. Assessment of Oral Complications:

Best Practice Statement:

When stomatitis or other oral complications are identified from screening and become a ***focus of care****,* ***routine assessment*** *should begin. For high-risk patients,* ***routine assessment*** *should begin at the start of treatment.*

Assessment includes rating mucositis (using the Stomatitis Staging System scale), and considers a range of oral symptoms and response(s) to interventions over time. The MCR will be used for documentation of routine assessment until the oral complications are resolved.

Assessment should be incorporated into both the Basic and Intensified Mouth Care Plans.

3. Dental Assessment and Care

Best Practice Statement:

Patients who are scheduled to receive chemotherapy of any kind, or radiotherapy to the head and neck, or hematopoietic stem cell transplant should be assessed by a dentist prior to the cancer treatment. If the cancer treatment is intermediate or high risk, the dental assessment should be done by a dental team experienced with oral oncology. Other dental assessments may be done by the patient's community dentist in consultation with the oncology specialist(s). The dental examination and assessment should be done as soon as possible, to allow time for any dental procedures and adequate healing prior to the cancer treatment. If dental work is indicated, this should be carried out before cancer treatrment is started. Dental exams may be repeated during active therapy on the advice of the oncology team.

Table 9- Guideline Recommendations/Suggestions and Best Practice Statements

4. Oral Hygiene

Guideline Suggestion:

Use of a uniform, systematic plan for oral care, along with standard educational approaches to help patients understand and cope with the symptoms of oral complications, is suggested. The comprehensive management plan(s) may reduce the severity of mucositis caused by chemotherapy or radiotherapy.

Level of Evidence: III **Grade of Recommendation: B**

Guideline Suggestion:

Patients on active chemotherapy or radiotherapy should be educated on appropriate mouth care practice (including oral hygiene procedures) and encouraged to follow the practice(s) during active treatment. Basic oral hygiene is particularly important for any patient who is immunocompromised.

Level of Evidence: III **Grade of Recommendation: B**

- **Mouth Rinse Solutions**

Best Practice Statement:

Patients should be encouraged to thoroughly rinse out their mouths using a mouth rinse solution. Water, normal saline or sodium bicarbonate solution may be considered as reasonable options for mouth rinse solutions. Commercial solutions with hydroalcoholic base or astringent properties should be discouraged for routine mouth rinse during active cancer therapy.

5. Management Plans

Guideline Suggestion: *Use of a uniform, systematic plan for oral care, along with standard educational approaches to help patients understand and cope with the symptoms of oral complications, is suggested. The protocol should be multidisciplinary. One component of the protocol should be the use of a soft toothbrush that is replaced on a regular basis. The comprehensive management plan(s) may reduce the severity of mucositis caused by chemotherapy or radiotherapy.*

Level of Evidence: III **Grade of Recommendation: B**

Best Practice Statement:

For routine care, the oral complication treatment components are compiled into Mouth Care Plans. The Basic Mouth Care Plan is used for most patients. The Intensified Mouth Care Plan is used for patients as they develop intermediate to severe stomatitis (on the Stomatitis Staging System scale), returning to the Basic Mouth Care Plan when stomatitis and other symptoms have resolved. These Mouth Care Plans should be integrated into hospital nursing care plans for cancer patients and used as a basis for health education of ambulatory patients.

6. Prevention of Oral Complications:

- **Mucositis Prevention**

Best Practice Statement:

Patients with oral mucositis require appropriate therapeutic intervention(s) to prevent symptoms.

- **Benzydamine**

Guideline Recommendation:

Benzydamine is recommended for prevention of radiation-induced mucositis in patients with head and neck cancer receiving moderate-dose radiotherapy.

Level of evidence: I **Grade of recommendation: A**

Table 9- Guideline Recommendations/Suggestions and Best Practice Statements

• **Radiotherapy Delivery**
Guideline Recommendation:
Midline radiation blocks and three-dimensional radiation treatment to the oral cavity should be used where possible, to reduce mucosal injury.
Level of evidence: II **Grade of recommendation: B**

• **Cryotherapy**
Guideline Recommendation:
Patients receiving 5-fluorouracil-based chemotherapy should be treated with oral cryotherapy (ice chips in the mouth for 30 minutes starting 5 minutes before chemotherapy administration) to prevent stomatitis. This recommendation may be suspended if oxaliplatin is included in the chemotherapy regimen.
Level of Evidence: II **Grade of Recommendation: B**

Guideline Suggestion:
Patients receiving high-dose melphalan as part of a conditioning regimen for stem cell transplant should be treated with oral cryotherapy to prevent oral mucositis.[2]
Level of Evidence: II **Grade of Recommendation: A**

• **Human Keratinocyte Growth Factors**
Guideline Recommendation:
In patients with hematological malignancies receiving high dose chemotherapy and total body irradiation with autologous stem cell transplant, Keratinocyte Growth Factor-1 (Palifermin) in a dose of 60 µg/kg/day for 3 days prior to conditioning treatment and for 3 days post-transplant is recommended for the prevention of oral mucositis.[2]
Level of Evidence: I **Grade of Recommendation: A**

• **Agents Which Have Not Proven to be Effective for Prevention of Mucositis**
Guideline Recommendation: *Chlorhexidine should **not** be used to prevent oral mucositis in patients with solid tumors of the head and neck who are undergoing radiotherapy.*
Level of Evidence: II **Grade of Recommendation: B**

Guideline Recommendation:
*Sucralfate should **not** be used for the prevention of radiation-induced oral mucositis.*[2]
Level of Evidence: II **Grade of Recommendation: A**

Guideline Recommendation:
*Antimicrobial lozenges should **not** be used for the prevention of radiation-induced oral mucositis.*[2]
Level of Evidence: II **Grade of Recommendation: B**

Guideline Recommendation:
*Acyclovir and its analogues should **not** be used routinely to prevent mucositis.*
Level of evidence: II **Grade of recommendation: B**

Guideline Recommendation:
*Glutamine should **not** be used routinely to prevent mucositis.* [2]
Level of evidence: II **Grade of recommendation: C**

GM-CSF Mouthwashes
Guideline Recommendation:
*Granulocyte-Macrophage Colony Stimulating Factor (GM-CSF) mouthwash formulations are **not** recommended for prevention of mucositis in patients undergoing hematopoietic stem cell transplant.* [2]
Level of evidence: II **Grade of recommendation: C**

Table 9- Guideline Recommendations/Suggestions and Best Practice Statements

Guideline Recommendation:
*Pentoxifylline is **not** recommended for prevention of mucositis in patients undergoing hematopoietic stem cell transplant.*
Level of evidence: II **Grade of recommendation: B**

7. Management of Oral Mucositis:

Best Practice Statement:
Patients with oral mucositis require appropriate therapeutic intervention(s) to manage the symptoms and prevent symptom progression. It is suggested to use the "stepped" approach for mucositis management, adding agents as symptoms present.

- **Chlorhexidine**

Guideline Recommendation: *Chlorhexidine should **not** be used to treat established oral mucositis.*
Level of Evidence: II **Grade of Recommendation: A**

8. Management of Xerostomia:

Guideline Statement:
Patients at risk of xerostomia may be managed by preventative measures. If xerostomia occurs in patients receiving radiotherapy to the head and neck, oral pilocarpine should be considered for systemic therapy. If the xerostomia is caused by chemotherapy or other toxic stimuli, oral pilocarpine may be considered. Artificial saliva products may also be considered, for a brief course to determine effectiveness and patient acceptability, followed by continuing therapy when warranted.

- **Saliva stimulants**

Guideline Recommendation[3]**:**
Patients with radiation-induced xerostomia should be considered for treatment with oral pilocarpine.
Level of Evidence: I **Grade of Recommendation: A**

9. Management of Oral Pain:

Best Practice Statement:
Patients who experience oral pain, alone or in combination with other oral complications, may be treated with coating suspensions, topical analgesic solutions, topical anesthetics or pain relief mouthwash suspensions, and systemic analgesics (for increasing severity of the pain). Clinicians should only use the institutional standard(s) for pain relief mouthwash formulations.

- **Pain Relief Mouthwashes**

Best Practice Statement:
An analgesic or anesthetic mouthwash should be considered for management of patients with oral pain. For ease of administration, multiple components may be compounded together into a pain relief mouthwash preparation. The appropriate compounded pain relief mouthwash preparation should be incorporated into the oral care procedures.

Compounded preparations should not include more than one agent from the same therapeutic classification. An institution should limit the selection of compounded pain relief mouthwash preparations to two or three standard formulae.

- **Management of Severe Oral Pain**

Guideline Recommendation: *Hematopoietic stem cell transplant (HSCT) patients should be offered patient-controlled analgesia with morphine (or other strong opiate) to manage severe oral pain.*
Level of Evidence: I **Grade of Recommendation: A**

Table 9- Guideline Recommendations/Suggestions and Best Practice Statements

10. Prevention and Management of Oral Infection:

Best Practice Statement:

Treatment with prophylactic antibiotic therapy may be considered for patients who are seriously myelosuppressed and/or who have poor oral hygeine, to prevent oral infections. Antibiotic prophylaxis may be topical or systemic.

Prophylactic use of chlorhexidine to prevent oral infections is not recommended for adults. Potential antimicrobial effects are offset by other adverse effects in patients with oral mucositis.

- **Infection Management**

Best Practice Statement:

Treatment with appropriate antibiotic agents should be considered for patients with an active oral infection, especially in patients who are immuno suppressed. Antibiotic treatment may be topical or systemic, and the treatment plan should consider fungal, bacterial and viral opportunistic superinfections. If topical antibiotics are used, they must be given in conjunction with proper oral hygiene as part of the mouth care plan.

Best Practice Statement:

Patients who are at risk, or who have been diagnosed with candidiasis (thrush) should be treated with oral fluconazole 100mg qd (or another oral azole antifungal agent). Oral nystatin suspension or alternate forms of nystatin delivery may be considered if fluconazole is contraindicated.

11. Nutrition in Patients with Oral Complications:

Best Practice Statement: *Maintenance of adequate nutrition may be compromised in patients with oral complications to cancer treatment. A referral to a dietitian should be considered for patients experiencing difficulties with eating during and after cancer treatment.*

References:

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2. Keefe DM, Schubert MM, Elting LS, et al. Updated clinical practice guidelines for the prevention and treatment of mucositis. Cancer, 2007; 109: 820-31
3. Head and Neck Cancer Disease Site Group. Hodson DI, Haines T, Berry M. Symptomatic treatment of radiation-induced xerostomia in head and neck cancer patients (full report). Toronto (ON): Cancer Care Ontario (CCO); 2004.

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